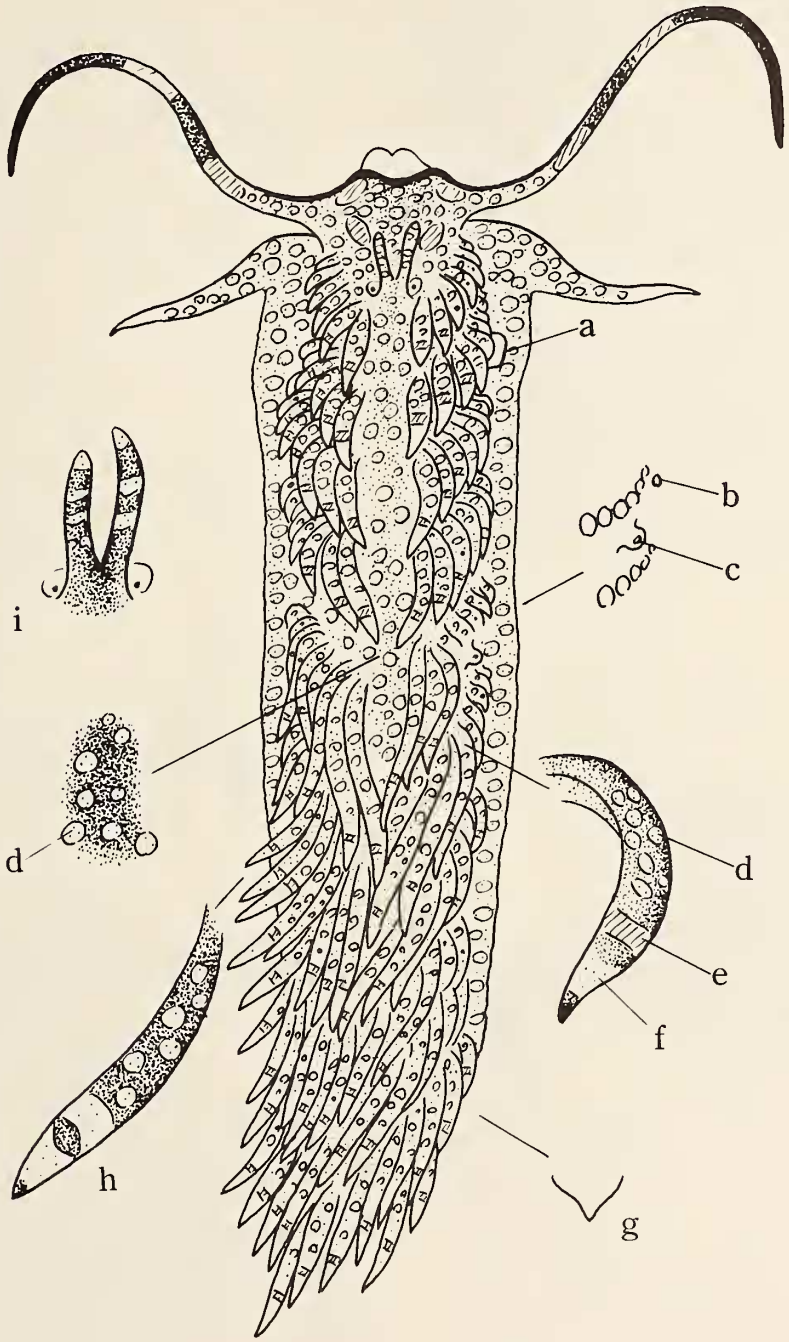

Figure 10

Cerberilla albopunctata Baba, spec. nov.
from Tomioka, Amakusa
Holotype, collected on May 22, 1974; length 27 mm

a – genital orifices b – nephroproct c – anus f – opaque white cap g – tail end (preserved state)
d – white spots e – chrome yellow band h – branchial papilla (preserved state) i – rhinophores

chrome yellow patches. The length of the oral tentacles is colored with chrome yellow, bluish black, pale yellow and deep black, according to the sections from the base to the tip. The outer surface of the branchial papillae is black spotted with white. It bears a chrome yellow band near the upper end. The extreme tip of the papillae is black, below which lies a cap of opaque white. The inner surface of the papillae is uniformly blackish. The protruded muzzle is white. The sole is slightly blackish white. The paratypes No. 1 and No. 2 and Dr. Horikoshi's animal agree with holotype in the main patterns of coloration of the body.

The mouth parts of paratype No. 2 were dissected. The jaw has a smooth edge. The radular formula is 17× 0·1·0. All the teeth are yellowish. Each tooth is in the form of a shallow arch which bears 7 to 8 major denticles on either side of the median notch. Of these major denticles, the one at the margin is the most stoutish, and slightly longer than the inner ones. There occur accessory denticles between the major denticles.

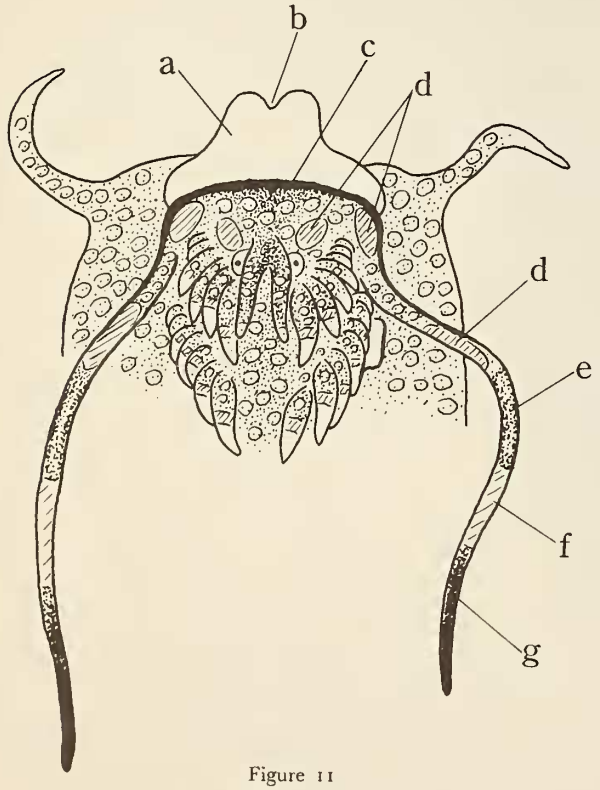

Figure 11

Cerberilla albopunctata Baba, spec. nov.
Head region of the holotype

a – muzzle b – mouth c – black line
d – chrome yellow patches e – bluish black band
f pale yellow band g – black extremity

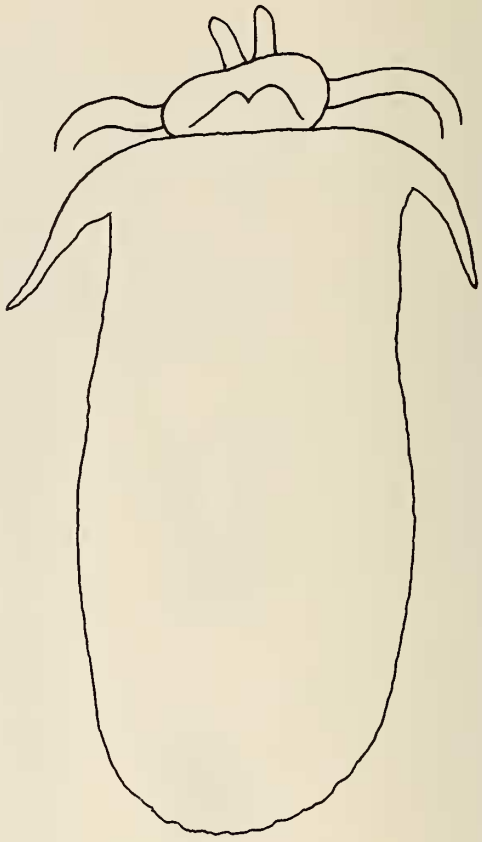

Figure 12

Cerberilla albopunctata Baba, spec. nov.
Ventral view of the holotype showing an expanded foot sole

Remarks: The present new species is most closely allied to the members of the second group of *Cerberilla* (namely *C. moebii*, *C. annulata*, *C. affinis*, *C. longicirrha*, and *C. africana*, see McDonald & Nybakken, 1975: 381, fig. 2) in the shape and denticulation of the radular teeth. But it is distinguished from them by its blackish general color marked closely with white spots. In this new species, the anus is not always in the same situation (see also Burn, 1966: 28): it is found to be cleioproctic in the holotype and in the paratype No. 2, and pleuroproctic in the paratype No. 1.

A burrowing habit of the paratype No. 1 was personally observed by Dr. Inaba. The holotype was found by Mr. Doi from the surface of the sandy-mud zone exposed after an ebbing tide. It was brought to the laboratory and kept alive for several days in a small aquarium with ap-

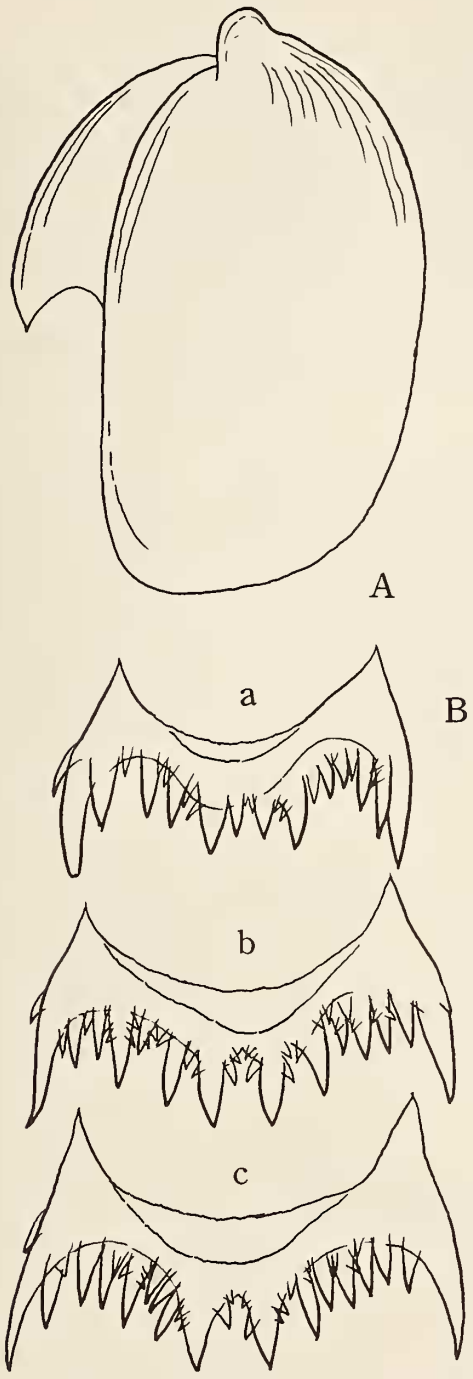

Figure 13

Cerberilla ***albopunctata*** Baba, spec. nov.
Paratype No. 2 from Sugashima near Toba, collected on June 4, 1943
A: Left jaw plate × 35
B: Teeth from the distal end (a) and the middle (b, c) of the radular ribbon × 110

proximately a similar condition as in the natural habitat of the animal. The burrowing of the animal into the substratum took place quickly by the ploughing actions of the protrusible muzzle. The animal, once submerged completely in the substratum, remained almost motionless for a long period in the light as well as in the dark. A feeding habit of it could not be experimentally studied.

SUMMARY

A list of the species of *Cerberilla* occurring in Japan was presented.

1. *Cerberilla asamusiensis* Baba, 1940 was redescribed. Its range of distribution was established to cover the Pacific coast line of Japan from north to south.

2. *Aeolis longibranchus* Volodchenko, 1941 from the Japan Sea was correctly referred to *Cerberilla*. The range of distribution of this species was extended to the Pacific coast of middle Japan.

3. *Cerberilla* ***albopunctata*** Baba, spec. nov. was established. The blackish body color closely spotted with white is characteristic for this species which occurs on the Pacific coast of middle and southern Japan. The animal of this species was seen to burrow into the sandy-mud substratum of the sea by the aid of the muzzle.

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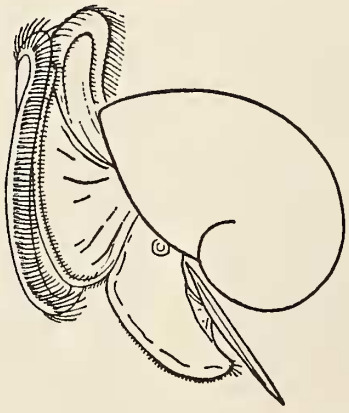

Two New Permian Chitons from West Texas

(Mollusca : Polyplacophora)

BY

ALLYN G. SMITH[1]

(4 Plates)

INTRODUCTION

A THOROUGH DISCUSSION of the stratigraphy, faunal elements, and the ecology of the Texas Permian has been published by YOCHELSON (1956) and by BATTEN (1958) based on a 15-year intensive program of zonal collecting in the deposits of west Texas and New Mexico. The main part of these collections consists of silicified fossils etched with hydrochloric acid from about 60 tons of limestone blocks. This etching program was actively pursued by G. Arthur Cooper, United States National Museum of Natural History, and by Norman D. Newell, American Museum of Natural History, as part of a general collaborative study of the Permian paleontology of west Texas, (NEWELL, RIGBY, *et al.*, 1953: 10).

Although Yochelson's account primarily is concerned with certain groups of Permian gastropods, he makes brief mention of the occurrence of fossil chitons from several different localities (1956: 188 - 193). These chiton valves, which are deposited in the United States National Museum of Natural History, were loaned to me for study through the cooperation of Dr. Cooper and his associates in the Department of Paleobiology. They come from a total of 33 localities, a list with a brief description of each being provided in Appendix A, below.

The chiton valves from these locations are by far the largest assemblage collected to date from strata of Paleozoic age. They total 435, of which 386, or 89% belong to a single species. The remaining valves appear to represent 8 other species. All are undescribed and can be assigned to 4 genera, of which 2 are undescribed. All valves from the area belong in the subclass Neoloricata, family Lepidopleuridae (considered in its broadest sense). One of the species undoubtedly belongs in the genus *Helminthochiton* Salter in M'Coy, 1846, which contains a number of species described from the Carboniferous of Europe and from strata of equivalent age (Mississippian and Pennsylvanian) in the United States. Two other species, which are the subject of this report, are assigned to the genus *Pterochiton* Carpenter in Dall, 1882, which so far has been limited to European species, also of Carboniferous age.

In general, this large series of Permian chiton valves is remarkably well preserved; many of them still retain significant valve characters such as sutural laminae and apical areas; an unusual number shows what is believed to be original microsculpture in considerable detail.

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SYSTEMATIC TREATMENT

Class POLYPLACOPHORA de Blainville, 1816

Subclass NEOLORICATA Bergenhayn, 1955

Order LEPIDOPLEURINA Thiele, 1910

LEPIDOPLEURIDAE Pilsbry, 1892

Pterochiton Carpenter in Dall, 1882

Pterochiton arthurcooperi A. G. Smith, spec. nov.

(Figures *1* to *28*)

General Diagnosis: Chiton of medium to large size when adult, based on a series of extremely well-preserved valves acid-etched from limestone blocks collected at or near the boundary between the Leonard and Word formations, Glass Mountain area, and the Cherry Canyon formation, Guadalupe Series, Gaudalupe Mountains area, west Texas (YOCHELSON, 1956: 186; fig. 2). The head valves are somewhat more than semicircular in area; intermediate valves subquadrate, slightly longer than wide, the sideslopes forming an obtuse angle; tail valves elongate-ovate

with prominent mucros, posteriorly placed. There are no distinctive sculptural features but the basic microsculpture of the tegmentum consists of an extremely fine decussation on all valve areas. Ventrally, the articulamentum lacks insertion plates but the sutural laminae on the intermediate and tail valves are large and well developed.

Table 1

Pterochiton arthurcooperi A. G. Smith, spec. nov.
Numbers and Positions of Valves

USNM Paleobiology Loc. No.	Head	Intermediate	Tail	Total
701 - 1	–	1	–	1
702	3	7	2	12
703	2	11	5	18
703 - a	1	–	–	1
703 - bs	–	1	4	5
703 - c	17	95	20	132
706	–	1	–	1
706 - b	–	–	1	1
706 - c	–	2	–	2
707 - d	–	–	1	1
707 - e	–	3	1	4
707 - ha	–	1	–	1
709 - c	–	2	1	3
719 - x	–	2	–	2
720 - d	–	7	2	9
721 - j	1	18	7	26
721 - s	–	1	1	2
721 - t	1	2	–	3
721 - u	–	6	3	9
721 - y	1	–	–	1
721 - z	1	7	–	8
722 - g	–	1	–	1
722 - l	–	3	–	3
725 - d	1	11	–	12
726 - o	3	7	2	12
726 - r	–	1	1	2
726 - z	–	4	1	5
727 - a	–	–	1	1
728	6	44	11	61
731	2	3	1	6
735 - a	6	35	4	45
Totals - 31 localities	45	276	69	390

Localities: Valves of this species have been identified from 31 localities in the west Texas Permian, which are listed in Table 1. Those from Loc. No. 703-c are designated as the type series because of their considerable number, excellent preservation, and the good distribution between head, intermediate and tail valves.

Type Locality: West Texas Permian Loc. No. 703-c, Word Formation; sponge bed; about the middle of limestone no. 2, crest of slope, 400m to 800m SW of road fork near old Word Ranch, 27.2 - 28.8km NNE of Marathon; Hess Quadrangle, Texas.

Type Specimens: Holotype, USNM No. 211115, an intermediate valve measuring: length, 13.2; width, 11.8; height, 4.4mm. The remaining 131 valves from USNM Loc. No. 703-c, comprising 17 head, 94 intermediate and 20 tail valves, are designated as paratypes. Figured paratypes are USNM Nos. 221116 - 221118, 221120 - 221124, and 221132, respectively.

Description: The head valves are low-arched, have semicircular anterior margins, and the gently curved side-margins extend posteriorly, making the valves slightly longer than wide. The posterior margins are almost straight across with small, pointed apices. Ventrally, they have broad, thickened ridges near the posterior margins and there are evidences of narrow apical areas that extend about $\frac{2}{3}$ the distance across the anterior edges of the valves.

Intermediate valves generally are longer than wide, straight-sided, with well-defined, blunt jugal ridges. The angle of divergence of the side-slopes ranges from 110° to 115°. The side-margins have only a moderate curvature, but the posterior margins are obtusely angled toward the anterior with a pointed apex, giving the valves a broad-winged aspect. Some of the intermediate valves have obsolete flexures that tend to set off what might be considered as lateral areas but if present at all, they are weakly defined. The anterior margins of the tegmentum areas are quite sinuate, forming well-developed "false

Explanation of Figures *1* to *8*

Pterochiton arthurcooperi A. G. Smith, spec. nov.

Figure *1*: Holotype (USNM No. 211115). Intermediate valve from Loc. 703-c. Dorsal view. Length, 13.2mm
Figure *2*: Side view, left side of the same. Height, 4.4mm
Figure *3*: Ventral view of the same. Width, 11.8mm
Figure *4*: Enlarged view of the same taken perpendicularly to the left side-slope showing lirations on the dorsal side of the left sutural lamina
Figure *5*: Same as Figure *4*, except view of right side-slope
Figure *6*: Anterior edge view, showing angle of divergence of side-slopes. Height, 4.4mm
Figure *7*: Paratype (USNM No. 211116). Head valve from Loc. 703-c. Dorsal view. Length, 9.7mm
Figure *8*: Same as Figure 7. Enlarged view, showing microsculpture

Figure *1*

Figure *2*

Figure *3*

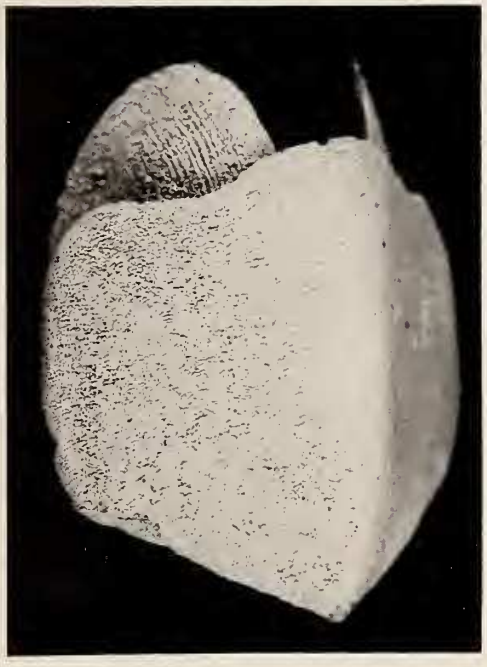

Figure *4*

Figure *5*

Figure *6*

Figure *7*

Figure *8*